

plant went down very much, whilst the manufacturing costs were increased in a manner that absolutely brought the pneumatic refining processes into competition.

The cause of all these defects admits of being well explained in the following manner : The easily fusible pig iron trickles down after melting and comes in contact with the ore, whereby the characteristic changes result, i.e. iron silicate and phosphate are first formed which dissolve iron oxide and now reach the bottom of the furnace on which they must exercise their action.. Only when the quantities of molten metal become larger are the iron-rich slags forced away from the bottom and compelled to react on a larger scale on the limestone charged with it. It cannot at the outset, however, do this, since the ferruginous slag acts on all the reducing agents in the molten iron, thus also on the carbon, which gives with it, as is known, strongly endothermic reactions. The quantities of heat which reach the reaction zone with the melted iron are here consumed until the limit of the action of carbon on ore is arrived at. It is, therefore, impossible to permit of the origination of a hot bath of metal of uniform composition; most usually the under portion of the charge forms itself into a paste, which consists of ferruginous slag and particles of metallic iron, which in different places are unequally strongly pre-refined. This mass conducts heat somewhat equally as badly as bad small-sized scrap. The iron peroxide of the iron ore is thereby for the most part only reduced to iron protoxide, and the occurrences permit of being expressed by the formulae :

One also sees clearly during the melting down that carbon monoxide issues by fits and starts through isolated canals which reach from the interior to the upper surface of the mass, which belch out small amounts of slag forming small craters round the outlet places, thus giving evidence of the work of the reactions taking place in the interior. Only after further time making the upper surface so hot is achieved that it forms itself into a proper bath of iron, which then afterwards liquefies the under layers. Only then has the temperature